

[0041] In one embodiment, each switch pad comprises a plurality of press detection switches and said plurality of press detection switches are evenly distributed in a matrix pattern mounted on the upper surface.

[0042] In one embodiment, the matrix pattern comprises at least one column with a plurality of press detection switches and/or at least one row with a plurality of press detection switches, wherein the column and/or the row of press detection switches comprises different number of press detection switches.

[0043] In one embodiment, the electronic device is an electronic device from the group comprising: a portable radio communication equipment, a mobile radio terminal, a mobile telephone, a cellular telephone, a pager, a communicator, an electronic organizer, a smart phone, a computer, a game console, a remote control or game device.

[0044] In one embodiment, the electronic device comprises the input device according to any of the preceding embodiments relating thereto.

[0045] In one embodiment, the electronic device comprises the switch device according to any of the preceding embodiments relating thereto.

[0046] In one embodiment, the electronic device comprises the input actuator according to any of the preceding embodiments relating thereto.

[0047] The features of the above-mentioned embodiments can be combined in any combinations.

[0048] Some embodiments of the invention provide for an improved input device, switch device, and/or an input actuator for inputting information, commands and/or data to a communication device, e.g. an electronic device. As compared with the known prior art, it is an advantage with some embodiments of the invention that at least one press detection switch of the plurality of press detection switches is contacted simultaneously upon depression of the soft conductive input actuator despite the fact that other press detection switches are out of order. Thus, some embodiments of the present invention provide the user of a communication device with a more reliable input of data/commands and at the same time achieves a higher redundancy for such input.

[0049] It is an advantage of some embodiments of the invention that the input device withstands mechanical load better and also provides a better resistance against dust and/or dirt and oxidation for the input device, the switch device, the input detector and the electronic device. This is due to the fact that a plurality of digital devices in combination simulates an analogue function according to the invention. The invention also reduces the height of a portable electronic device and also the number of components required for doing this, and therefore reduces the cost of the device. Furthermore, the invention also provides a very low height and a flat shape of the actuator when implemented in a mobile device, whereby the use of the restricted space in such a device is optimized.

BRIEF DESCRIPTION OF THE DRAWINGS

[0050] Further objects, features and advantages of the invention will appear from the following detailed description of the invention, wherein embodiments of the invention will be described in more detail with reference to the accompanying drawings, in which:

[0051] FIG. 1A is a schematic exploded top view of a prior art rocker key device;

[0052] FIG. 1B is a schematic exploded bottom view of the prior art rocker key device of FIG. 1A;

[0053] FIG. 2A is a schematic top view of four prior art switches arranged in four selectable directions of operation;

[0054] FIG. 2B is a schematic arrangement of the prior art switches in FIG. 2A with four additional directions of operation to be selected;

[0055] FIG. 3A is a schematic arrangement of eight individually selectable prior art switches providing eight selectable directions of operation;

[0056] FIG. 3B is a schematic side view of a prior art rocker key device comprising the arrangement of FIG. 3A;

[0057] FIG. 4 shows the prior art switch of FIGS. 1A-3B in more detail;

[0058] FIG. 5 illustrates a mobile telephone including an input device according to some embodiments of the invention;

[0059] FIG. 5A is a schematic side view of input devices according to some embodiments of the invention;

[0060] FIG. 5B is a schematic side view of an input device according to another embodiment of the invention;

[0061] FIG. 6 is a top view of a switch pad of the input device of FIG. 5A;

[0062] FIG. 6A is a top view of an embodiment of the switch pad of FIG. 6;

[0063] FIG. 6B is a top view of another embodiment of the switch pad of FIG. 6;

[0064] FIG. 6C is a top view of yet another embodiment of the switch pad of FIG. 6;

[0065] FIG. 6D is a top view of another embodiment of a switch in the switch pad of FIG. 6;

[0066] FIG. 7 is a top view of still another embodiment of the switch pad of FIG. 6;

[0067] FIG. 8 is a top view of another embodiment of the switch pad of FIG. 6;

[0068] FIG. 9 is a top view of another input device according to the invention;

[0069] FIG. 10 is a schematic side view of the input device in FIG. 9 in a non-active state;

[0070] FIG. 11 is another schematic side view of the input device in FIG. 10 in an active state;

[0071] FIG. 12 is a top view of the active area of the input device in FIG. 11;

[0072] FIG. 13 is yet another schematic side view of the input device in FIGS. 10 and 11 in yet another active state;

[0073] FIG. 14 is a top view of the active area of the input device in FIG. 13;

[0074] FIG. 15 is a side view of yet another input device according to the invention;

[0075] FIG. 16 is a top view of the active areas of the input devices in FIGS. 12 and 14 as projected down on the switch pads shown in FIGS. 6-8, and

[0076] FIG. 17A to 17D shows different embodiments of the input device of FIGS. 9-14.

DETAILED DESCRIPTION OF EMBODIMENTS

[0077] Embodiments of the present invention will be described more fully herein-after with reference to the accompanying drawings, in which embodiments of the invention are shown. Like numbers refer to like elements throughout.

[0078] FIG. 4 illustrates an electronic device embodied as a mobile telephone 40. Embodiments of the invention may be implemented into a wide variety of electronic devices. The electronic device may e.g. be a mobile radio terminal, a pager, a communicator, a smart phone, a Personal Digital Assistant